

WHAT IS CLAIMED IS:

1. An electron beam proximity exposure apparatus, comprising:
an electron beam source which emits a collimated electron beam;
a mask substrate on which a plurality of masks with apertures are formed;
a mask moving mechanism which moves the mask substrate; and
a stage which holds and moves an object,
wherein the mask moving mechanism moves the mask substrate so that one of the plurality of masks is arranged on a path of the electron beam in proximity to a surface of the object, and a pattern corresponding to the aperture of the one of the plurality of masks is exposed on the surface of the object with the electron beam having passed through the aperture.

2. The electron beam proximity exposure apparatus as defined in claim 1, wherein:
the plurality of masks are arranged with a distance away from each other on the mask substrate; and
portions of the plurality of the masks of the mask substrate are thinner than other portions.

3. The electron beam proximity exposure apparatus as defined in claim 1, wherein at least two of the plurality of masks formed on the mask substrate have an identical pattern.

4. The electron beam proximity exposure apparatus as defined in claim 3, wherein:
the plurality of masks are arranged with a distance away from each other on the mask substrate; and
portions of the plurality of the masks of the mask substrate are thinner than other portions.

5. The electron beam proximity exposure apparatus as defined in claim 1, wherein:
each pattern exposed on the object is exposed by two exposures in which a first mask and a second mask are respectively used; and
the plurality of masks formed on the mask substrate comprise a set of the first mask

and the second mask.

6. The electron beam proximity exposure apparatus as defined in claim 5, wherein:
the plurality of masks are arranged with a distance away from each other on the mask substrate; and
portions of the plurality of the masks of the mask substrate are thinner than other portions.
7. The electron beam proximity exposure apparatus as defined in claim 5, wherein at least two of the plurality of masks formed on the mask substrate have an identical pattern.
8. The electron beam proximity exposure apparatus as defined in claim 7, wherein:
the plurality of masks are arranged with a distance away from each other on the mask substrate; and
portions of the plurality of the masks of the mask substrate are thinner than other portions.
9. A mask unit which is used in an electron beam proximity exposure apparatus comprising an electron beam source which emits a collimated electron beam, a mask with an aperture which is arranged on a path of the electron beam, and a stage which holds and moves an object, wherein the mask is arranged in proximity to a surface of the object and a pattern corresponding to the aperture of the mask is exposed on the surface of the object with the electron beam having passed through the aperture,
wherein the mask unit comprises a single mask substrate on which a plurality of the masks are formed.